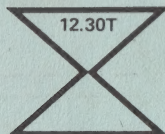


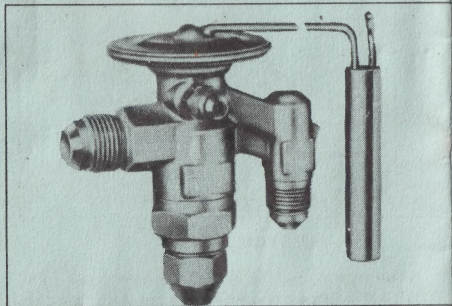


TYPES HC AND HCE THERMO EXPANSION VALVES



FEBRUARY, 1975
Sup'ds bul. dtd March, 1974

ALCO HC AND HCE THERMO EXPANSION VALVES ARE DESIGNED TO MEET THE SPECIFIC DEMANDS OF REFRIGERATED DISPLAY CASES, REACH-IN AND WALK-IN COOLERS, AND ALL COMMERCIAL APPLICATIONS RANGING FROM HIGH TO LOW TEMPERATURES.



- No Packing for Leak Free Performance
- Forged Brass Body
- Small Compact — Fits any Installation
- Contour Power Assembly — 100,000 Cycle Life
- Contaminants Cannot Restrict Moving Parts
- Free Floating Design — Minimum Friction
- Corrosion Resistant Materials
- Wrench Flats on Inlet and Outlet
- Removable Inlet Strainer
- Safe Working Pressure 400 PSIG
- Safe Working Temperature 300°F

R-12		R-22		R-502		LINE CONNECTIONS		REMOTE BULB TUBING LENGTH	TYPE EQUALIZER	SHIPPING WT.
VALVE TYPE	TONS @ 60 # P.D.	VALVE TYPE	TONS @ 100 # P.D.	VALVE TYPE	TONS @ 100 # P.D.	INLET	OUTLET			
HC½FW	.25	HC½FW	.50	HC¼RW	.25	1/4 or 3/8 SAE	3/8-1/2 SAE	5'	INTERNAL or 1/4" SAE EXTERNAL	1 lb. 6oz.
HCE½FW		HCE½HW		HCE¼RW						
HC½FW	.50	HC1HW	1.0	HC½RW	.50					
HCE½FW		HCE1HW		HCE½RW						
HC1FW	1.0	HC1½HW	1.5	HC1RW	1.0					
HCE1FW		HCE1½HW		HCE1RW						
HC1½FW	1.5	HC2HW	2.0	HC1½RW	1.5					
HCE1½FW		HCE2HW		HCE1½RW						
HC2FW	2.0	HC3HW	3.0	HC2RW	2.0					
HCE2FW		HCE3HW		HCE2RW						
HC3FW	3.0	HC5HW	5.0	HC3RW	3.0					
HCE3FW		HCE5HW		HCE3RW						

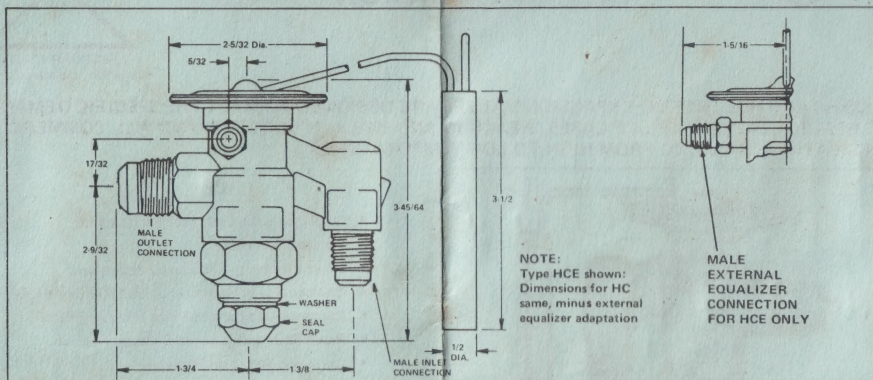
Nominal capacities based on 40° F Evap. Temp. and 100° F Liquid Temp.

TABLE 2. MOTOR OVERLOAD PROTECTION If Required by Compressor Manufacturer			
APPLICATION	R12	R22	R502
COMMERCIAL	FW35	HW65	RW65
LOW TEMP.	FW15	HW35	RW35

TABLE 4.						
NOMENCLATURE	HC	E	2	F	W	15
	Valve Type	External Equalizer (omit for Internal Equalizer)	Capacity in Tons	System Refrigerant	Charge Symbol	MOP (Optional)

TABLE 3. CORRECTION FACTORS			
REFRIGERANT LIQUID TEMP. °F.	FACTOR		
	R12	R22	R502
40	1.33	1.34	1.48
60	1.22	1.29	1.32
80	1.12	1.13	1.16
90	1.06	1.06	1.08
110	.94	.93	.92
120	.88	.87	.89
130	.81	.81	.76
140	.75	.75	.68

When actual Liquid Temperature is other than 100°F, Multiply the required Valve Capacity by the factor shown above.



VALVE SELECTION

To select a valve, determine:

1. The required refrigeration load in tons.
2. The liquid inlet temperature.
3. The evaporator temperature
4. The pressure drop across the valve
5. Internal or external equalizer requirement.

NOTE: The selection of an internal (type HC) or external (type HCE) equalized valve depends upon the pressure drop from the valve outlet (including distributor if used) to the end of the evaporator.

As a general guide an external equalizer type valve may be used when the pressure drop exceeds the following.

Air Conditioning Range (+50 to +35°F)	= 3 PSI or more
Commercial Range (+30 to 0°F)	= 2 PSI or more
Low Temperature Range (zero and below)	= 1 PSI or more

The above table should be used as a reference only as the final selection of an internal or external valve will depend on actual system test or performance.

SELECTION WARNING

The products included in this catalog are intended for use on the following refrigerants at rated conditions.

R12	(dichlorodifluoromethane)
R22	(monochlorodifluoromethane)
R502	(by weight 48.8% monochlorodifluoromethane, 51.2% monochloropentafluoroethane)

Do not use Alco Thermo valves on other fluid media without prior approval of the Alco Engineering Department. Use on fluids not listed could result in valve failure and/or system damage.

INSTALLATION

1. Before installing the Thermo-Valve, be sure the system is thoroughly clean and dry. An Alco EK liquid line filter-drier is recommended.
2. Be sure valve is installed so its flow arrow corresponds to flow direction through piping.
3. Clean surface of suction line where remote bulb is to be attached and secure bulb in position with clamping device provided.
4. Check for sufficient refrigerant charge and be sure no flash gas is present.

SUPERHEAT ADJUSTMENT

Standard factory superheat setting for FW, HW, & RW non-MOP charges is 6A (6°F at 32°F bulb bath temperature).

To adjust to other superheat settings:

1. Remove seal cap and washer from bottom of valve. This will expose wrench flats (3/16-inch square) which are provided at the bottom of the adjusting stem.
2. Turn the adjusting stem in a clockwise direction (when viewed from bottom of valve) to increase the superheat and counter-clockwise to decrease superheat (approximately 3% per turn). NOTE: Allow adequate time between adjustments for system to stabilize before checking superheat.
3. When desired superheat setting is accomplished, reinstall washer and seal cap.

ADDITIONAL INFORMATION

If additional information is required pertaining to valve selection, superheat setting, location of remote bulb, etc., contact your nearest Alco Field Engineering Representative or Alco Controls Division direct.

R12 EXTENDED CAPACITIES

VALVE TYPE NUMBER		R12 EXTENDED CAPACITIES																	
		EVAPORATOR TEMPERATURE (°F)																	
		+40					+20					0							
		PRESSURE DROP ACROSS VALVE (PSI)																	
		60	80	100	120	150	—	60	80	100	120	150	—	75	100	125	150	175	—
CAPACITY IN TONS																			
HC½FW HCE½FW	.25	.29	.32	.35	.40		.24	.28	.31	.34	.38		.23	.27	.30	.33	.35		
HC¾FW HCE¾FW	.50	.58	.65	.71	.79		.48	.55	.62	.68	.76		.46	.53	.60	.65	.71		
HC1FW HCE1FW	1.0	1.2	1.3	1.4	1.6		.96	1.1	1.2	1.4	1.5		.92	1.1	1.2	1.3	1.4		
HC1½FW HCE1½FW	1.5	1.7	1.9	2.1	2.4		1.4	1.7	1.9	2.0	2.3		1.4	1.6	1.8	2.0	2.1		
HC2FW HCE2FW	2.0	2.3	2.6	2.8	3.2		1.9	2.2	2.5	2.7	3.0		1.8	2.1	2.4	2.6	2.8		
HC3FW HCE3FW	3.1	3.6	4.0	4.4	4.9		3.0	3.4	3.8	4.2	4.7		2.9	3.3	3.7	4.0	4.4		

VALVE TYPE NUMBER		EVAPORATOR TEMPERATURE (°F)																	
		-10					-20					-40							
		PRESSURE DROP ACROSS VALVE (PSI)																	
		75	100	125	150	175	—	75	100	125	150	175	—	75	100	125	150	175	—
		CAPACITY IN TONS																	
HC½FW HCE½FW	.20	.23	.26	.28	.30		.16	.19	.21	.23	.25		.11	.12	.14	.15	.16		
HC¾FW HCE¾FW	.40	.46	.52	.56	.61		.33	.38	.42	.46	.50		.21	.24	.27	.30	.32		
HC1FW HCE1FW	.79	.91	1.0	1.1	1.2		.65	.75	.85	.92	1.0		.42	.49	.54	.60	.64		
HC1½FW HCE1½FW	1.2	1.4	1.6	1.7	1.8		.98	1.1	1.3	1.4	1.5		.63	.73	.82	.90	.97		
HC2FW HCE2FW	1.6	1.8	2.1	2.2	2.4		1.3	1.5	1.7	1.9	2.0		.83	.98	1.1	1.2	1.3		
HC3FW HCE3FW	2.5	2.8	3.2	3.5	3.8		2.0	2.3	2.6	2.9	3.1		1.3	1.5	1.7	1.9	2.0		

VALVE TYPE NUMBER	R22 EXTENDED CAPACITIES																	
	EVAPORATOR TEMPERATURE (°F)																	
	+40						+20						0					
	PRESSURE DROP ACROSS VALVE (PSI)																	
	75	100	125	150	175	200	100	125	150	175	200	225	125	150	175	200	225	250
CAPACITY IN TONS																		
HC½HW HCE½HW	.43	.50	.56	.61	.66	.71	.49	.54	.60	.64	.69	.73	.52	.57	.62	.66	.70	.74
HC1HW HCE1HW	.87	1.0	1.1	1.2	1.3	1.4	.97	1.1	1.2	1.3	1.4	1.5	1.0	1.1	1.2	1.3	1.4	1.5
HC1½HW HCE1½HW	1.3	1.5	1.7	1.8	2.0	2.1	1.5	1.6	1.8	1.9	2.1	2.2	1.6	1.7	1.9	2.0	2.1	2.2
HC2HW HCE2HW	1.7	2.0	2.2	2.5	2.6	2.8	1.9	2.2	2.4	2.6	2.8	2.9	2.1	2.3	2.5	2.6	2.8	3.0
HC3HW HCE3HW	2.6	3.0	3.4	3.7	4.0	4.2	2.9	3.3	3.6	3.9	4.1	4.4	3.1	3.4	3.7	4.0	4.2	4.4
HC5HW HCE5HW	4.3	5.0	5.6	6.1	6.6	7.1	4.9	5.4	6.0	6.4	6.9	7.3	5.2	5.7	6.2	6.6	7.0	7.4

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE (°F)																	
	-10						-20						-40					
	PRESSURE DROP ACROSS VALVE (PSI)																	
	150	175	200	225	250	275	150	175	200	225	250	275	150	175	200	225	250	275
	CAPACITY IN TONS																	
HC½HW HCE½HW	.53	.57	.61	.64	.68	.71	.47	.51	.54	.57	.60	.63	.36	.39	.42	.44	.46	.49
HC1HW HCE1HW	1.1	1.1	1.2	1.3	1.4	1.4	.94	1.0	1.1	1.1	1.2	1.3	.72	.78	.83	.88	.93	.98
HC1½HW HCE1½HW	1.6	1.7	1.8	1.9	2.0	2.1	1.4	1.5	1.6	1.7	1.8	1.9	1.1	1.2	1.2	1.3	1.4	1.5
HC2HW HCE2HW	2.1	2.3	2.4	2.6	2.7	2.9	1.9	2.0	2.2	2.3	2.4	2.5	1.4	1.6	1.7	1.8	1.9	2.0
HC3HW HCE3HW	3.2	3.4	3.7	3.9	4.1	4.3	2.8	3.0	3.2	3.4	3.6	3.8	2.2	2.3	2.5	2.6	2.8	2.9
HC5HW HCE5HW	5.3	5.7	6.1	6.4	6.8	7.1	4.7	5.1	5.4	5.7	6.0	6.3	3.6	3.9	4.2	4.4	4.6	4.9

Valve capacities based on 100°F vapor free liquid entering the valve. To determine the valve capacities for other temperatures of vapor free liquid entering the valve, multiply the capacities listed above by the multiplier factors shown in Table 3.

R502 EXTENDED CAPACITIES

VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE (°F)																	
	+40						+20						0					
	PRESSURE DROP ACROSS VALVE (PSI)																	
	75	100	125	150	175	200	125	150	175	200	225	250	125	150	175	200	225	250
CAPACITY IN TONS																		
HC¼RW	.22	.25	.28	.31	.33	.35	.27	.29	.31	.34	.36	.38	.25	.27	.29	.31	.33	.35
HCE¼RW	.43	.50	.56	.61	.66	.71	.53	.58	.63	.67	.71	.75	.49	.54	.59	.63	.66	.70
HC½RW	.87	1.0	1.1	1.2	1.3	1.4	1.1	1.2	1.3	1.4	1.5	1.5	.99	1.1	1.2	1.3	1.3	1.4
HCE½RW	1.3	1.5	1.7	1.8	2.0	2.1	1.6	1.7	1.9	2.0	2.1	2.3	1.5	1.6	1.8	1.9	2.0	2.1
HC¾RW	1.7	2.0	2.2	2.5	2.6	2.8	2.1	2.3	2.5	2.7	2.8	3.0	2.0	2.2	2.3	2.5	2.6	2.8
HCE¾RW	2.9	3.3	3.7	4.0	4.4	4.7	3.5	3.8	4.2	4.4	4.7	5.0	3.3	3.6	3.9	4.1	4.4	4.6
VALVE TYPE NUMBER	EVAPORATOR TEMPERATURE (°F)																	
	-10						-20						-40					
	PRESSURE DROP ACROSS VALVE (PSI)																	
	150	175	200	225	250	275	150	175	200	225	250	275	150	175	200	225	250	275
CAPACITY IN TONS																		
HC¼RW	.25	.27	.29	.30	.32	.34	.22	.24	.25	.27	.28	.30	.16	.17	.18	.19	.20	.21
HCE¼RW	.50	.54	.58	.61	.64	.68	.44	.47	.51	.54	.57	.60	.31	.34	.36	.38	.40	.42
HC½RW	1.0	1.1	1.2	1.2	1.3	1.4	.88	.95	1.0	1.1	1.1	1.2	.62	.67	.72	.76	.80	.84
HCE½RW	1.5	1.6	1.7	1.8	1.9	2.0	1.3	1.4	1.5	1.6	1.7	1.8	.93	1.0	1.1	1.1	1.2	1.3
HC¾RW	2.0	2.1	2.3	2.4	2.6	2.7	1.8	1.9	2.0	2.1	2.3	2.4	1.2	1.3	1.4	1.5	1.6	1.7
HCE¾RW	3.3	3.5	3.8	4.0	4.2	4.4	2.6	2.8	3.0	3.3	3.5	3.7	2.0	2.2	2.4	2.6	2.8	3.0

Valve capacities based on 100°F vapor free liquid entering the valve. To determine the valve capacities for other temperatures of vapor free liquid entering the valve, multiply the capacities listed above by the multiplier factors shown in Table 3.

SAFETY INSTRUCTIONS

- Read installation instructions thoroughly. Failure to comply can result in valve failure or system damage.
- Do not use on service conditions or fluids not specifically cataloged, without prior approval of Alco Engineering Department. Use of Thermo valves on applications not specifically cataloged can result in valve failure and/or system damage. Specify Refrigerants Product is used on R12, R22 or R502.
- Protect against excessive vibration as it may result in a remote bulb tubing break which will cause valve failure.
- Foreign matter in the Thermo valve may cause diaphragm failure, flooding, or starving. Use of an EK Filter Drier or similar device is strongly recommended.
- Valves are factory set to a specific Superheat. If adjustment is needed, refer to instructions for proper procedure. Improper adjustment may result in system damage.
- Be sure valve is installed so that its flow arrow corresponds to flow direction through piping.
- Use back up wrench on all flare fittings. Overtorquing may result in valve body damage.
- Proper valve sizing is important. An oversized valve may result in erratic control. An undersized valve may considerably reduce system capacity.
- Do not exceed SWP (Safe Working Pressure) as excess internal pressure could cause damage to diaphragm resulting in valve malfunction.
- Do not exceed safe temperature limits as excess temperatures could cause internal damage resulting in improper valve function.



ALCO CONTROLS DIVISION • EMERSON ELECTRIC CO.
P.O. BOX 12700 • ST. LOUIS, MISSOURI 63141



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